Expanding Our High-End Computing Universe

Welcome to Blue Gene/L

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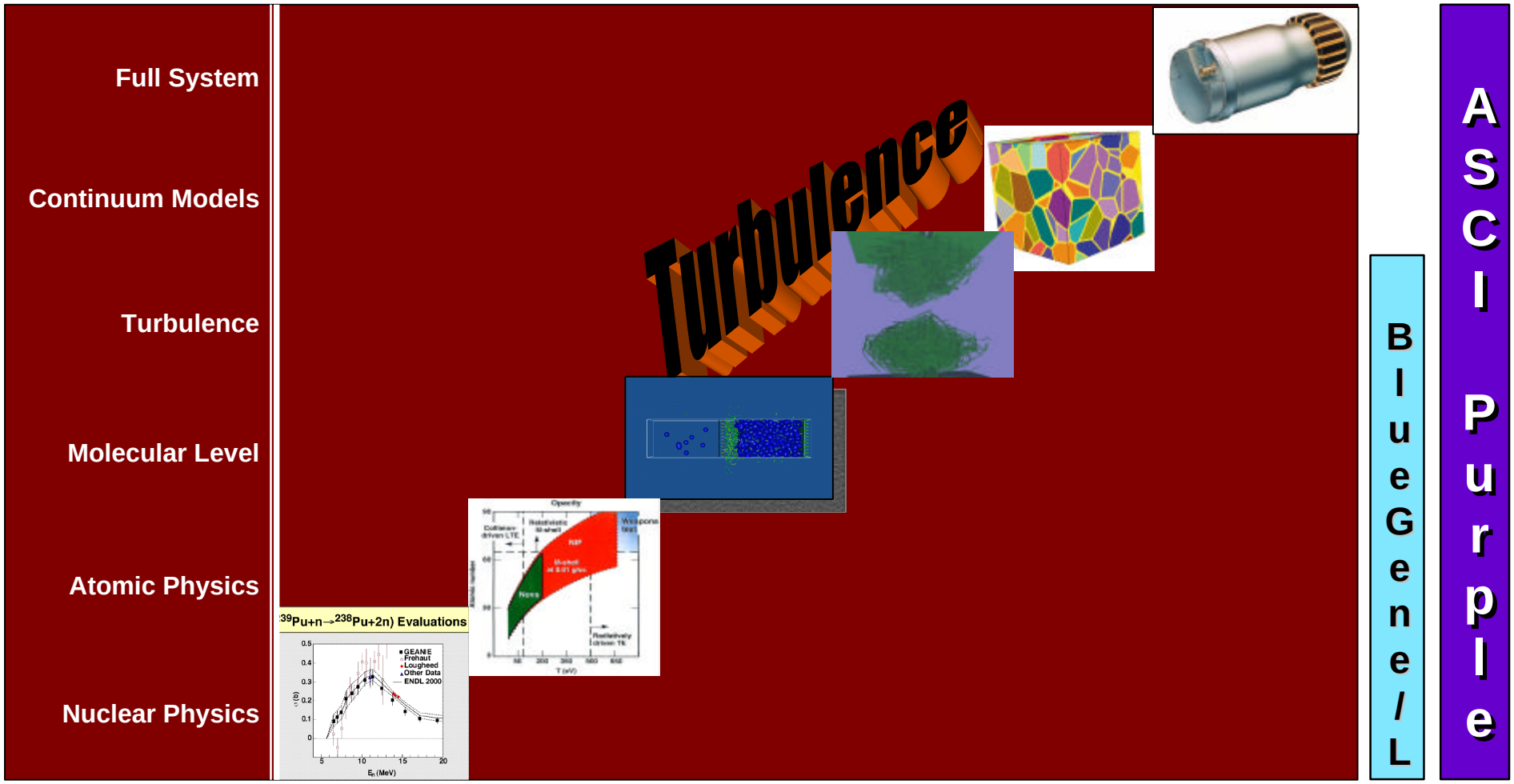
Blue Gene/L

One way of looking at Blue Gene/L is to look at the physics of scale



Blue Gene/L differs from current leading edge simulation platforms in some important areas

	White	Q	Earth Simulator	Blue Gene/L
Machine Peak Speed (Tflop/s)	12.3	30	40	180/360
Total Memory (Tbytes)	8	33	10	16–32
Footprint (sq. ft.)	10,000	20,000	34,000	2,500
Total Power (MW)	1.0	3.8	10.0	0.96
Cost (M$)	~100	~200	~350	Much Less
Installation Date	9/2000	~9/2002	2/2002	~12/2004
No. of Nodes	512	4,096	640	65,536
CPUs per Node	16	4	8	2
Clock Frequency (MHz)	375	1,000	500	700
Power Dissipation/Node (W)	1,953	922	6,400	15
Peak Speed/Node (Gflop/s)	24.0	7.3	64.0	2.8
Memory/Node (GiB)	16	8	16	0.25–0.5
Memory Bandwidth (TB/s)	8	19	164	360
Memory Latency (cycles)	140	330	–	70
MPI Latency (ms)	25	4.5	6–20	5
Interconnect Bandwidth (B:F)	0.042	0.085	0.13	1.5
Bi-Section Bandwidth (B:F)	0.04	0.04	0.03	0.008

Important points about Blue Gene/L

- Embedded technology promises to be an efficient path toward building massively parallel computers optimized at the system level
- Cost / performance is ~ 20 to 50 times better than standard methods to get to teraflops
- Low Power is critical to achieving a dense, simple, inexpensive packaging solution
- Blue Gene/L will have a scientific reach far beyond existing limits for a large class of important scientific problems
- Blue Gene/L will give insight into possible future product directions
- Blue Gene/L hardware will be flexible
- A mature, sophisticated software environment needs to be developed to really determine the reach (both scientific and commercial) of this architecture